

The TIMESTEP* Summer Internship Program

2023 Report: Internships for Undergraduate Majors in the Physical Sciences at U. Arizona

The TIMESTEP Summer Internship Program is a unique opportunity for UArizona undergraduates in the Physical Sciences to connect with small- to mid-sized businesses based in Southern Arizona. A robust internship program improves student retention and post-graduate job placement, both critical to the success of UArizona. Student engagement in the local business community also creates pathways for employment and strengthens the economic development of the region.

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- ### Critical UArizona Programmatic Needs
- Increasing student enrollment in majors in the Physical Sciences requires industry pathways as graduate program acceptance rates are low (UArizona Astronomy: ~5%)
 - Modernizing curriculum requires input from industry partners.
 - Astronomy, Math and Physics do not currently build local industry partnerships that include students.

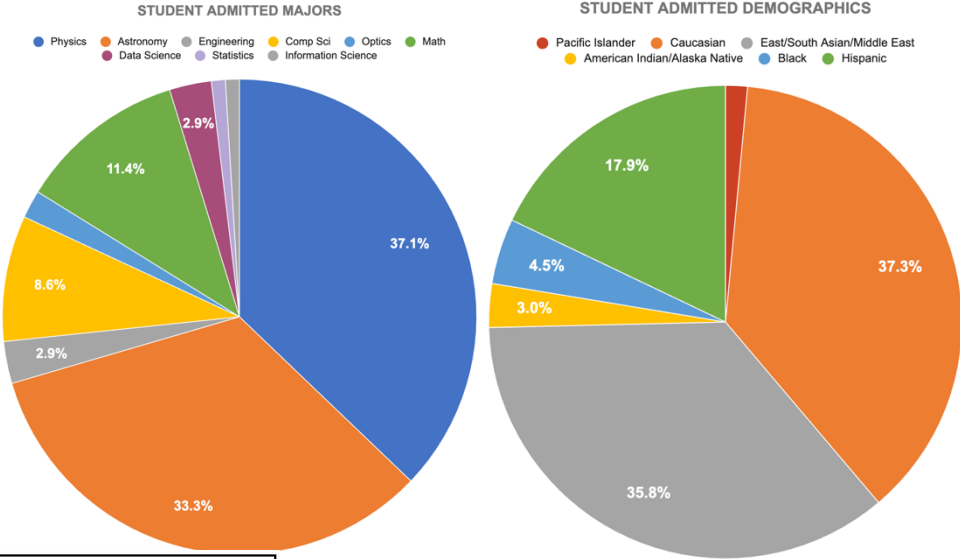
- ### UArizona Strategic Plan
- The Wildcat Journey:** provide students with the skills and mindsets to lead in the 4th Industrial Revolution.
 - Grand Challenges:** fully leverage 4th Industrial Revolution advancements to lead in the areas of Space, Data and Computing.
 - The Arizona Advantage:** fully embrace collaboration to fuel economic growth.

Student Intern and Applicant Demographics (2018-2023)

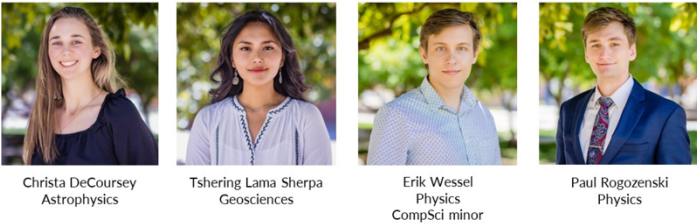
Applicants 2018-2023 (140 total):
 30% Female (vs. AST 40%, PHY 23%)
 20% URM (vs. AST 34%, PHY 22%)
 67% BIPOC

Admitted 2018-2023(63 total):
 24% Female (vs. AST 40%, PHY 23%)
 27% URM (vs. AST 34%, PHY 22%)
 66% BIPOC

The Applicant and Admitted population is representative of the demographics of female and URM scholars in Astronomy and Physics at UArizona.



Graduate Coordinators promote student success



A team of 4 Graduate Students (above) supported teams of 4 student interns each (left), providing mentorship throughout the internship.

*TIMESTEP: Tucson Initiative for Minority Engagement in Science Technology Program <https://lavinia.as.arizona.edu/~timestep/>

Employers

Small to mid-sized companies are targeted to strengthen the economic development of Southern Arizona. TIMESTEP provides part-time funding for students (20hrs/week, \$5000). Returning companies pay for half of the student salary.

Benefits to Employers:

- Access to a talented and diverse pool of students with strong physics, math and computing backgrounds.
- Increase economic competitiveness (< 50% of UA Physical Science graduates stay in Arizona; 2016 ABOR).
- The opportunity to scout talent for full-time positions in their organization.
- Employers report the TIMESTEP program is mutually beneficial for both students and employers.

"TIMESTEP is an excellent program that offers the opportunity to both mentor and collaborate with students. They can help accomplish important tasks for your company while gaining valuable experience. It's truly a win-win situation for all parties involved!" – Sonia Vohnout, OppsSpot LLC, 2023

"This is an extremely valuable program, and I hope it continues to expand" – Philip Macduff, Securaplane, 2023

"I am looking forward to the next TIMESTEP Intern that y'all provide Madden Media with. It has been a crucial building block for us to develop our Data & Insights team, with 3 of our 8 members coming directly from the program." - Reuben Bautista, Madden Media, 2023

"If all your students are as great as [our Intern], it's a great resource that any company should take advantage of!" – John Dagdelen Airth, 2023

The program has featured 34 unique employers since 2018. The Summer 2023 program featured 15 employers. Of these, 8 are returning companies (marked in bold), funding **\$37,500** to the program (44% of stipends dispensed).

Summer 2023 Employers(15) : **Airth**, **Ampcera**, BlackSky, CodeLucida, **Delta Thermal**, **IR Labs**, Lunasonde, **Madden Media**, **OppsSpot**, Optical Perspectives Group, **Paramium** (2 students), QScint Imaging Solutions, **Rincon Research**, Securaplane, and USA-National Phenology Network.

[Participated but not matched (3): **MSE Supplies**, Prime Solutions Group, Ridgetop Group Inc].

Goal 1: To build a program valued by both students and employers.

Experience of Employers Participating in the 2023 Program:

- 100% reported that students provided a meaningful contribution to the company.
- 100% reported that students met or exceeded expectations.
- 100% reported they would recommend the TIMESTEP program to other companies.
- 100% reported being interested in participating in the Summer 2024 program.
- 54% of employers reported being more likely to hire UA undergrads, the rest were unchanged in their opinion.
- **13 out of 15 employers indicated they would donate at least half the student salary for the 2024 program.**
- **14 out of 15 employers indicated they would hire their intern if they had the budget.**

"The students I have worked with in the TIMESTEP program have all been eager to learn and to succeed." – Brian Foster, IRLabs, 2023

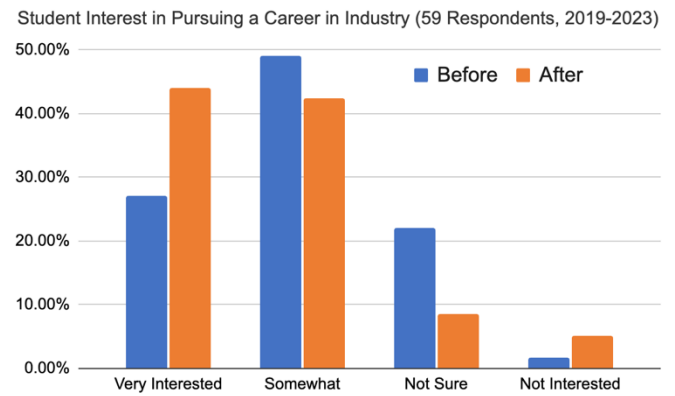
"[Our Intern] provided us a big leap forward on some auto quality analysis tools for lowlight images. ... [Our Intern's] work will help us identify these and provide better customer satisfaction in the future."- Nancy Thomas, BlackSky, 2023

"We expect a 60-80% reduction in time taken to produce data plots for our standardized testing, freeing engineers up to do analysis instead of rote operations." – Philip Macduff, Securaplane, 2023

"[Our Intern] enabled us to shine in the deliverables for one grant and to complete a prototype .. forecast that would not have otherwise been possible." – Alyssa Rosemartin, USA National Phenology Network, 2023

Students Report:

- Across 2018-2023, 98% of Interns would recommend this program to other students.
- 90% of Interns from 2021-2023 reported that TIMESTEP helped clarify their career path.
- Across 2019-2023, students report an increased interest in pursuing a career in industry after the internship and fewer students report being unsure of their interest in Industry (see right).



“Before the TIMESTEP internship, I did not at all consider directly entering industry after graduation. Now, after my internship, I am strongly considering industry as a post-graduation option. In short, TIMESTEP has changed my outlook for the better.” – 2023 Intern

“I feel much more confident entering the workforce -- I see it as something I desire more than a post-graduate degree.” – 2023 Intern

“I would say that my goals were pretty much accomplished. I was able to contribute to a project in a meaningful way and respond to feedback. I also gained a better understanding of the work that goes into months long projects.” – 2023 Intern

Goal 2: To Give Students the Experience and Confidence to Directly Enter the Workforce Upon Graduation

The TIMESTEP Internship Program has successfully connected students with regional employers.

- 95% of interns (2018-2022) have graduated.
- 45% of interns (2018-2022) are working in Industry, 30% are in Graduate School, and 6% are Research Staff.
- **45% of interns (2018-2022) found employment in Tucson, 5 in their TIMESTEP companies.**
- **6 students in the 2023 cohort (38%) are continuing to work for their TIMESTEP company in Fall 2023**
- Mel Rose, the graduate coordinator for the 2018 and 2019 programs, is working full time at Rincon Research and served as the TIMESTEP Intern supervisor for our Rincon Intern in Summer 2022.

“I feel that this internship provided strong experience and translatable technical skills. Through the internship, I participated in team meetings and smaller work groups that valued me. I have more confidence in myself and my abilities now and know how I fit into a bigger picture company. I think all my goals were adhered to and exceeded.” – 2023 Intern

“When I first started I was definitely nervous, but that feeling quickly went away after about the first couple of weeks. [This internship] has given me a lot of confidence for the future and has taught me a lot about professionalism.” – 2023 Intern

“I now have a pretty bolstered resume and connections to gain access to other internship programs” – 2023 Intern

“I'm pretty sure real world work experience through this internship is the only reason I got as many call backs as I did. It is a real plus on your resume.” – 2022 Intern, working as an Applications Engineer at Alicat Scientific (Tucson) in 2023.

“I learned a huge amount from my TIMESTEP internship, and it really sparked my interest and passion for Optics as a whole. I believe it was a reason I was admitted to grad school.” – 2023 Intern

The TIMESTEP Program aims to provide students with **professional development opportunities** to ensure students have access to training, role models, and feedback on their materials to support their career development.

For example, In April 2023, the Interns attended training workshops to build Core Identity and Resiliency through UArizona FORGE Playshops. TIMESTEP also offered students a soldering workshop to bolster that skillset.

The Interns also met with industry experts on Feb 2nd 2023 who offered advice about entering the job market in the tech sector. Panelists were from participating TIMESTEP companies, including: Nicholas Chung (**Neurovascular Research and Design**), Carl Cox (**Madden Media**), Hui Du (**Ampcera**), Chris Foster (**IR Labs**), Joel Huebner (**Rincon Research Corporation**), Sahand Sabet (**Revolute Robotics**), Philip MacDuff (**Securaplane**).

In addition, on Feb 8th 2023 Interns had their resumes edited by industry experts, including by folks with astronomy and physics PhDs who now work in industry.

The Graduate Coordinators were required to attend a 4 hour workshop on Leadership and Mentorship, facilitated by Sherard Robbins (consultant working at Visceral Change) in March 2023. This workshop prepared our Graduate Coordinators to meet with their 4 interns weekly throughout the summer and help them troubleshoot any issues.

Right: Interns also met in person as a group several times during the summer for mentoring meetings about topics such as redefining “failure” and “success”.



Interns also met with alumni of the TIMESTEP program in a virtual meeting to learn how past Interns utilized their internship to pursue careers in industry and apply for graduate school. Presenters included: **Marco Barragan** (2022 Intern, now at Madden Media in Tucson), **Deandre Capati** (2018 Intern, now at Hermeus), **Naomi Nguyen** (2021 Intern, now a Software Engineer at Snap Inc), **Felix Pat** (2022 Intern, now a graduate student at UC Berkeley), **Shitij Seth** (2019 Intern, now at Accelerate Diagnostics in Tucson).

“I now have some solid experience as a Software Engineer which is extremely useful for me when I begin applying to post-graduation positions. [This Internship] has provided me with insight into the industry and new skills that I can take with me to my next position.” - 2023 Intern

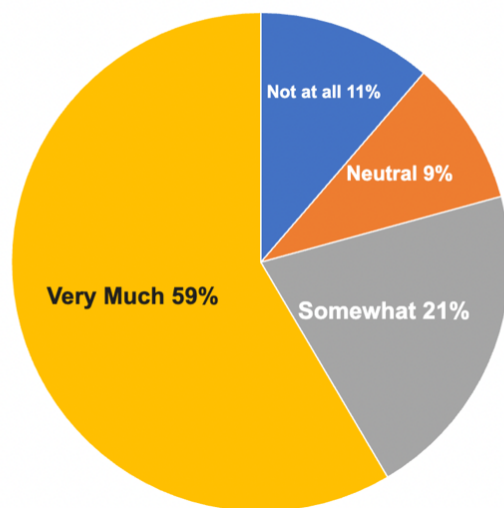
“Getting experience working at a company and interacting with my coworkers has given me a better idea of what exactly a remote, technical job may look like. I think that I have a good idea of how software engineering/data analysis work gets done at a company and how I may fit into that sort of organization.” - 2023 Intern

Goal 3: To Improve Retention and Graduation Rates among UArizona Students

TIMESTEP aims to improve graduation rates by showing students many career pathways and increasing their confidence in achieving those careers.

80% of interns report the program is helping their motivation to continue their degrees (pie chart) and cohort graduation rates are high (see Goal 2).

To what extent has this internship help motivate you towards completing your degree (2020-2023, 53 Respondents)



“This was an amazing opportunity and it’s been a great addition to my college experience.” – 2023 Intern

“My project closely aligns with both of my majors and I think it’ll be helpful for my future.” – 2023 Intern

“I recognize that my internship is in a distinct field from astronomy, but I am gaining many transferrable skills in data analysis. This makes me feel more ready for either an industry career or further education.” – 2023 Intern



Students shared their experiences with their peers at the TIMESTEP Internship symposium held on August 30th in partnership with the University of Arizona Space Institute (*left, ASI Director, Erika Hamden, introduces the event*). The symposium was attended by Astronomy & Physics majors, TIMESTEP employers, faculty and staff, and families of the Interns – 70 individuals RSVPd for the event.

Goal 4: To Increase Regional Economic Growth and Competitiveness by Keeping Talent Local

Students report a marked increase in their interest in pursuing post graduate employment in the Tucson area (see Pie Charts).

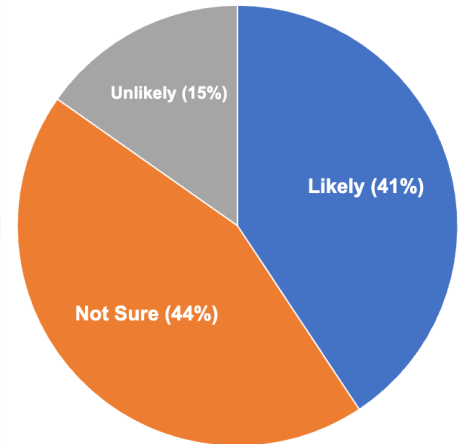
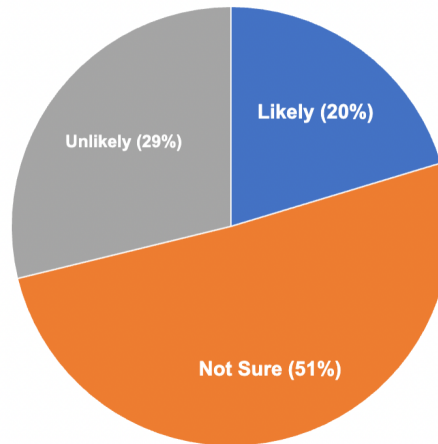
"I learned about the wide variety of job opportunities available [in Tucson] which I would not really know about if not for the other interns. I realize how much space there is for industry careers." – 2023 Intern

"I learned about many of the machine learning and computer vision careers that exist around the Tucson area." – 2023 Intern

"[Meeting the other interns] gave me an interesting look into different opportunities there are in Tucson and how they vary so widely." – 2023 Intern

Likelihood of Seeking Post Grad Employment in Tucson

Before Internship (2019-2023, 59 Respondents) After Internship (2019-2023, 59 Respondents)



Summary

Results: The sixth year of the TIMESTEP Internship Program has successfully met all desired outcomes. Interns were exposed to career opportunities that exist within the Tucson area and enabled them to apply their classroom knowledge towards real-world applications. TIMESTEP's summer internship program has been shown to increase student interest in local employment and has led to several permanent positions for students. Employers continue to report high satisfaction and a strong desire to continue participation in the program. This year also featured a record 50 student applicants. **Future:** In 2024 we aim to grow the Internship program to include supporting Geoscience, Hydrology, and Atmospheric Science majors and related companies in the Tucson area. **New Challenges:** Many students reported not having transportation to several employer locations (28% of applicants), particularly to the UA Tech Park. This limited the possible matches between students and employers, resulting in students who were excluded from positions for which they were qualified. This remains a challenge that we will need to troubleshoot for next year's program.

Funding Report: Summer 2023

We are grateful for funding from the below sponsors who supported the Summer 2023 TIMESTEP program.



Funding to pay student salaries (\$5K each) and operate the internship was provided by generous donations from the Thomas R. Brown Family Foundation (\$34.3K), UArizona office of Research Innovation & Impact (\$18K), Arizona FORGE (\$10K), Tech Launch Arizona (\$15K), UArizona SECD (\$5K), and the Arizona Institute for Resilient Environments & Societies (\$10K). Additional funding was secured from 8 returning companies (\$37,500). The internship is also supported by an NSF CAREER grant to PI Besla to fund program evaluation (\$10K). UArizona RII funding has further enabled the continued support of a full FTE program manager for the internship program, Rebecca Lipson.

Future: For the 2024 and 2025 program, PI Besla has successfully applied for an NSF SPACE DCL award for \$50K to fund additional student stipends, supporting the expansion of the program to include more majors from additional department in the UArizona College of Science. Furthermore, the TIMESTEP program is supporting a \$200K NASA proposal of Dr. Sukrit Ranjan (LPL), which would enable the expansion of our related Research Apprenticeship program to include Planetary Science research opportunities.